Modoc Plateau Vegetation Mapping Project Rollout, October 2nd, 2020. Section 1 and 2: Project Description and Products Transcript.

Slide 1 (00:04): Introduction

Good morning everyone. We are here to talk about the fine-scale vegetation classification and map of the Modoc Plateau and surrounding region. I am Rachelle Boul, the lead vegetation ecologist with the vegetation classification and Mapping program with the CA department of fish and wildlife. We are known to most as VegCAMP. VegCAMP is the project manager for this project although this project would not have been possible without many other people. We hope that you all find the data from this project and information presented today to be useful and we would love your feedback. It has been brought to our attention that many people are unaware of the vegetation data that VegCAMP supports and so this is part of our effort to get the information and data out to be used by local land managers and other potential users of vegetation data because as you will see, there is a lot in information and data here that could really drive and contribute to local land management decisions.

Slide 2 (1:27): Talking points

Today I will talk briefly about each component of the project to give you an overview of the process as well as make you aware of the products and data available that have come out of this project. I will talk about

1) The scope of the project and the contributors
2) I will briefly describe What vegetation classification and mapping is
3) I will talk about the field sampling effort
4) And the vegetation classification that came out of it
5) And then I will talk a bit about the map itself including the attributes embedded within it and where to find the data.
6) I will show you the report that describes most of the things that I will show you today (and where to find it)
7) And then I will give you a quick project status update

Slide 3 (2:24): Scope

The scope of the project that we are going to focus on today is everything that falls within the Modoc Plateau and NW Basin and Range USDA-defined ecoregions in brown which account for 4.8 million acres (4,870,622 acres) which is about 5% of the state. The project areas (the green, teal, and pink) cover approximately 47% of the Modoc Plateau ecoregion and 37% of the Northwestern Basin and Range ecoregion.

Fieldwork for Phase 1 in green started in 2016 and Phase 2 in teal started in 2018. To define Phase 1 and 2 study areas, VegCAMP relied upon the map of USDA Ecological Subsections. The boundary of the Phase 1 study area encompasses a 1.1-million-acre and Click excludes large areas of private land on the Madeline Plains and the Pit River Valley subsections. The Phase 2 study area is approximately 1 million acres and click covers most of the Devil's Garden Ecological Subsection, along with all of Horsehead Mountain and the southern portion of Adin Mountains and Valleys.

An additional 50,000 acres immediately adjacent to the Phase 1 footprint in pink is what we call the Applegate and eagle lake project area is encompassing the Eagle Lake-Observation Peak and Bald Mountain-Dixie Valley ecological subsections and data collection was started in 2017 for that area.

Overall, the cumulative study area is approximately 2.2 million acres leaving approximately 2.4 million acres (2,408,070 acres) of these two ecoregions for future mapping efforts.

And then just for your information, we also have the Doyle-Loyalton mapping project that started in 2019, which is just to the south in orange and not fully shown here. This project is currently in progress and mostly outside the focal ecoregions and the scope of todays discussion but just know that it will be coming down the pipe when some additional funding is secured.

Slide 4 (5:27): Collaboration

Although VagCAMP facilitates the sampling, classification, and mapping of CA natural communities, it is imperative that we work collaboratively with many other programs, agencies, and contractors in order to move towards our goal of having a fine scale vegetation classification and map of the state. This project is no exception. Phase 1 and 2 of this project (shown all in green here) was initiated in 2016 with mitigation funding from Region 1 of the California Department of Fish and Wildlife (CDFW). Amy Henderson, specifically, was instrumental directing funds to this project to enable better conservation planning. So we'd like to thank, you, Amy.

The CDFW Wildlife Conservation Board also provided partial funding for this project under a grant.

This area was sampled by field crews from geographic information center (or GIC) out of Cal State univ Chico as well as VegCAMP staff, it is being mapped by the GIC, and the accuracy assessment sampling by GIC. Introduce GIC (Brian Kreb, can you introduce yourself and anyone else that is here with GIC).

The Applegate and Eagle lake (pink) was funded by BLM and sampling was done by CNPS and mapping was done by the Aerial Information Systems (or AIS) out of Redlands, CA . Introduce AIS (John Menke, introduce yourself and others) and introduce CNPS (Julie).

The Doyle Loyalton project (in orange) was started with CDFW Big game funds and is currently in the mapping phase and is being mapped by GIC.

So we are very very thankful and grateful for all of the contributors and collaborators.

Slide 5 (9:12): What is Vegetation

So now that we know the general region that we are talking about, I'd like to step back for a few minutes and just talk about what vegetation is. Vegetation communities are groups of species that tend to co-occur and repeat across the landscape. So what we are doing here is sampling these communities, over and over again, so that we can name them and define them. Once we have clear definitions for the vegetation communities, or vegetation types, a map can be made using aerial imagery in ArcGIS where the mappers will correlate what was seen on the ground to what is seen in the imagery. So as you can see it's really crucial to starts with the field data collection on the ground.

Slide 6 (10:10): Sample Allocation

But in order to implement a thorough field sampling effort over such a large project area, it's crucial to develop a sample allocation to direct the sampling. A sample allocation is Pre-selecting samples before you go out into the field, and A good sample allocation will captures all of the vegetation types within your study area, distribute your samples evenly across your study area, while also making sampling more efficient by reducing travel time, and also reduce potential for auto-correlation (which is basically when you have collected 2 samples that are too close to one another and they are essentially within the same stand).

For this project, Rosie Yacoub created the sample allocation by first limiting the scope of the allocation to only areas that were accessible to the field crews (within a certain distance from a road as well as properties that crews had permission to access) and then she used a Generalized Random Tessellation Stratified (GRTS) survey design to stratify the remainder of the study area. Speaking simply, She used GIS layers to identify unique combinations of important factors that drive the vegetation in the project area. So things like min and max temp, precipitation, elevation, geology, etc. can all be used…Rosie, specifically for this project, used the course CalVeg layer, the national wetland inventory layer, and the CalFire layers to identify where unique vegetation types should grow and then randomly generated points to direct the field crews to those areas.

This approach, in combination with manually photo-interpreted allocation points and also subjective identification of stands by field crews, was used to maximized efficiencies and also increase the diversity of vegetation types that were sampled.

Slide 7 (12:33): Field sampling

That sample allocation was then used to direct sampling, which, as I mentioned before, started in 2016 for this project.

Slide 8 (12:43): Field Sampling

The CDFW/CNPS rapid assessment/releve protocol was used to collect all the data for this project. This protocol includes a lot of information about the stand that you are sampling and its placement in the landscape including: click Environmental data such as coordinates, slope, aspect, topography, soil

surface cover, and much more; click a general narrative description of the stand and any other interesting things about it; click information that will tell us more about the wildlife habitat relationships; click a field assessed vegetation type; click strata covers and heights; and of course, click individual species and cover values.

It's important to note that while the sample allocation was used to direct field sampling, the field crews play a crucial role in noticing repeating vegetation types that need to be sampled. So perhaps the sample allocation was repeatedly missing a certain vegetation or community type, or the allocation points were placed in stand transitions. It was the field crews' job to make sure that all communities were being captured and that the surveys were being placed within a homogeneous site.

You can read more about the protocol for the data collection by following the link at the bottom here or by going to the VegCAMP website and go to the "publications, Protocols, and Standards" page. The form and sampling protocol are also appendices in the report for this project that we will talk more about in a few minutes.

Slide 9 (14:39): Field sampling

The goal is always to collect data evenly distributed across the study area, within all possible vegetation types. Here is the distribution of the survey points collected within the project boundaries. These survey points are now available through Biogeographic Information and Observation System (or BIOS which is an online data viewer maintained and hosted by CDFW) in a layer called ds1020. This is a layer of many of our survey points taken throughout the entire state and is updated periodically and has been update to include these data from this project. I will talk about BIOS a little more in a few minutes and Rosie will actually show you a live tutorial a bit later.

Once we had all the field data collected it was then analyzed by VegCAMP ecologists to develop our vegetation classification for the region.

Slide 10 (15:42): Classification

In total**,** GIC and VegCAMP collected 627 surveys within phase 1 and 2 areas. CNPS collected another 230 surveys within the applegate and eagle lake areas. In addition, click 1,193 existing surveys from other projects and agencies were gathered to be co-analyzed with the data collected to create the vegetation classification.

These other data sets included:

- USFS Eco plots collected on the Modoc National Forest in the late 1980's and early 1990's
- as well as recently collected Assessment Inventory and Monitoring (AIM) surveys collected by BLM-NRCS that were sampled within the focal ecoregions.
- samples from the US National Parks Service for the Lava beds National Monument
- and then also VegCAMP surveys from past projects

In total, 2050 surveys were included in this data analysis.

All the data were quality checked and standardized and prepared for data analysis to create the vegetation classification that defines the vegetation types within the ecoregions.

Vegetation classification analysis entails grouping similar plots together based on species covers and abundance. This colorful spreadsheet (that I don't want you to read) shows an example of how these conifer surveys (each line is a survey) are grouped together…each color is a different community type… and the fact that these communities are grouping near each other indicates that they are related to each other.

Slide 11 (18:19): Hierarchy

All of this information goes into creating a hierarchical vegetation classification that follows the National Vegetation Classification system. If I zoom in here click you can see the different levels of the hierarchy. The finest levels of the classification click are the alliance and association levels, with the associations nesting under the alliances. But above alliance and association are broader levels that group communities that are geographically and ecologically related. So the hierarchy shows the relationship between communities.

As I mentioned, the final classification follows the national vegetation classification system which allows us to maintain a national and international perspective and gives us the ability to communicate across state boundaries in regards to these communities and their relationship to wildlife…Of course we also maintain a local and state perspective that will highlight and represent California's unique communities. This hierarchy is can be found as Appendix A in the classification report.

Slide 12 (19:47): Classification

The hierarchy is important for many reasons; one reason being that it demonstrates how community types are related. So for example, the Artemisa tridentata alliance and the Eriogonum /Poa secunda alliances shown here fall within the Intermontane Tall and Dwarf sagebrush Scrub Steppe Macrogroup which tells us that they are both found in the intermontane western US where the landscape is dominated by sagebrush communities. But then they fall within different Groups under that macrogroup indicating that the Eriogonum alliance is more related to the low sagebush communities.

Slide 13 (21:26) : Classification

For this project 83 association that fall under 61 alliances were described for the area. 4 new alliance and 28 new associations for the state came out of this analysis and are likely mostly restricted to the northeastern corner of the state. In addition, 26 of the described alliances and 48 association are considered sensitive natural communities in CA. For example, this photo shows a newly described vernal pool alliance from this project. These pools have a different suite of species than what is found in the central valley vernal pools. Species such as Downingia bacagalupi a vernal pool specialist that is for the most part is only found in these ecoregions of CA.

Slide 14 (22:31): Type descriptions

For each these alliance and associations, descriptions are created. which can be found in the classification report as Appendix J. I don't expect you to read all of this but this in an example of the Western Juniper alliance description that can be found in the report for this project.

In here you will find click the general alliance concept, click the local distribution, click a list of the associations under this alliance, click summarized environmental information, and click a stand table. The stand table summarizes what species tend to occur in this alliance, the constancy of each species, and the average, minimum, and maximum cover for each species. And just to clarify, the constancy is

click the percentage of surveys that a species occurs in for a particular vegetation type. For example (use highlighter), Purshia tridentata is in 53% of the 343 surveys that went into describing the western juniper alliance in this analysis; with an average of about 4% cover within the plots that it's occurring.

Slide 15 (24:44): Vegetation key

All of this information is considered and summarized into a vegetation key to each type. This key is then adapted to be used for determining the vegetation types in the map as well as is used when determining vegetation types in the field. So any of you can take this key into the field and determine the alliance and association that you are in.

Those are all the components that come from the vegetation classification analysis. click

Slide 16 (25:29) : Map

now I will move into talking about the vegetation map. Of course, the vegetation classification, and the rules that drive the classification, drive the vegetation map as well. The goal with the vegetation map is to create a fine-scale (or alliance or association level), wall to wall, vegetation map…

Slide 17 (26:00): Map

…where each polygon containing a lot of data. So if you zoom into this map and look at an individual polygon click

Slide 18 (26:12)

….and open up the attributes for this polygon. You will see all the information that is embedded in this map for each and every polygon.

- Of course, you have the vegetation type that is based on the classification that was created from the data collected within the region. As I said, this is mostly an association level map.
- But you also have strata covers (tree cover broken down into confer and hardwood cover separately), shrub cover, herb cover, and then total vegetation cover
- There's also height of the dominant layer and tree size class (if applicable),
- There's a few project specific attributes in regards to the expansion of western Juniper within the region
- presence of isolated trees to help identify roosting and nesting sites for raptors and owls,
- attributes for various disturbance to the vegetation
- comments and other fields that can give you more information about the specific polygon
- the vegetation hierarchy is embedded in the map for each polygon to provide flexibility for the users
- there are crosswalks to other classification systems,
- and then the rarity rank is also listed for the finest level of the hierarchy that is listed for the polygon.

So let me go into a few of these attributes a little more. I have already talk about the vegetation type and how that is derived…but something related that I'd like highlight is the hierarchy

Slide 19 (28:28): Map is scalable

As I mentioned before, the classification is hierarchical which means it's scalable…and that feature is embedded into the vegetation map. This allows the user to scale the map to the level that is most useful for their purposes. For example, this map here, is showing the landscape divided into the finest level available in this map…the association level. This level is useful for identifying potential rare species habitat, or sensitive natural communities, and also for directing local level management.

Slide 20 (29:39) : Map is scalable

But, if perhaps, you only need to use the data at a broader level, the alliance level, because you want to identify the location of all the Juniper woodlands. This would simplify the map quite drastically and let the user direct management more broadly.

Slide 21 (30:05): Strata covers

Next I'd like to highlight the strata cover attributes. So for each polygon, a percent cover is estimated for the total tree layer, and also separately for the confer and hardwood cover, the shrub cover, the herbaceous cover, and then the total vegetation cover.

Slide 22 (30:55): Strata covers

And in addition to dividing polygons on vegetation type, the polygons are also divided based on these strata covers. So if you look at this map, you will see that all of the blue polygons here are 1 single vegetation type. They are all the Western juniper / big sagebrush - Antelope Bitterbrush association. And the polygons are being differentiated by the conifer cover (or the Juniper cover) and/or by the shrub cover.

And if you take a look at these two photos, which are also both take within this same association, you will see that they look very different and are potentially providing different habitat. So this differentiation of stands based on strata cover can provide more direction for management depending on your goals.

Slide 23 (32:33) : Juniper attributes

The next set of attributes that I'd like to highlight for you is these two attributes here: the juniper expansion and the restoration attributes. These attributes are particular to this mapping project. For all mapping projects it is part of our process to involve and consult with the local land managers within the region to determine what is important information for them; what, in addition to our typical attributes, would be useful to them for making better and more informed management decisions. And these attributes came out of that discussion.

Slide 24 (33:13): Juniper attributes

The range of western juniper has expanded in the past 150 years due to fire suppression, overgrazing, and climatic change; which can impact grazing habitat for dear and livestock. So the juniper expansion attribute identifies polygons where young junipers have expanded into shrubby or herbaceous landscapes. The attribute also has an intensity range that identifies when there is minimal (up to 4%), moderate (4-10 %), or high expansion (>10% young junipers). Which can be used as thresh holds of

when removal of juniper (or restoration of the site) might occur. And the restoration attribute identifies sites were juniper removal has already occurred so that the communities in those places could potentially be tracked over time to see if that restoration is moving in the direction that is best for the landscape.

Slide 25 (34:43): Disturbances

Ok, so let's now talk a little about the disturbance attributes. Within each polygon, the presence and severity of disturbance from clearing, roadedness, development, and invasive plant species is noted.

Slide 26 (35:00) : Disturbances

Rosie will talk more in depth about the possible uses of at least one of these a little later, but in general, using this attribute you can differentiate between highly disturbed and relatively pristine sites and spatially identify them. And, in combination with other attributes to determine areas of potential restoration or conservation.

Slide 27 (36:28): Rarity

The last attribute that I'd like to highlight for you all is the global and state rarity. For each polygon the global and state rarity rank is listed for the finest level of the hierarchy that is attributed for the polygon. This polygon is attributed to the association level, where we give yes/no ranks and you can see here that this association is "No" which means it is not a sensitive natural community. A little bit later, Diana Hickson will be talking a bit more in depth about rarity ranking but I mostly wanted to point out that it is embedded in the map as an attribute for each polygon so that you can spatially identify the sensitive natural communities. And that…

Slide 28 (37:27): Rarity

Appendix A in the report lists all the vegetation types that are found within the study area along with the rarity ranks for each alliance and association.

Slide 29 (37:42): Accuracy

An important part of following the mapping standards that VegCAMP has developed is testing the map for accuracy and reporting the accuracy of each community type mapped. The accuracy of the mapped vegetations types is done through a formal accuracy assessment where field crews assess specifically allocated polygons without knowing what the mappers called it and the field data is compared to the mapped types and score is given for each polygon assessed. These individual polygons scores are then summarized to give an overall score for the map and a score for each type that was mapped.

Here is our polygon that we've been looking at the whole time, the accuracy for this polygon was assessed using a standard accuracy assessment protocol that we use for all mapping projects. These yellow boxes are around all the information collected in the field.

The pink cells contain the information attributed in the map for this polygon,

and the blue cell indicate the final vegetation type, score, and other notes determined by a VegCAMP ecologist for the final assessment. And I'm not sure if you can see, but this polygon was called the Juniper / artemisia tridentata – Purshia tridentata association by the Photo interpreters (or the mappers), that's what the field crew called it for the accuracy assessment, and the VegCAMP ecologist

also agreed upon final review of all the information. So for this polygon, the mappers were 100% correct and got a 5/5.

I do wanted to point out that comprehensive accuracy assessment results will be included in the final mapping report due in the spring of 2021 along with the methodology used, but preliminary accuracy assessment results for phase 1 can be found in this report as Appendix I.

Slide 30 (40:48): Report

everything I just described, except for the mapping information, can be found in the classification report that, that I keep mentioning. The report can be found here ultimately through this linke…It isn't there quite yet but will be soon. I'd like to quickly go through each of these thing in the report so that you know where they are and what they look like and you have some context. Open report.

In the report you have the project design and who funded it and everything. The background for this project. You have the study area description and of course you have more in-depth methods for the sample allocation used for this project. Methods for field sampling and data analysis.

The you have the results that includes information about the taxa included and the classification that came out of that. And then a little blurb about the vegetation map. But information about the map will be in a report that is yet to come.

The products that I went through and have already discussed are mostly appendices of this report. Appendix A being the vegetation classification and hierarchy with also lists the rarity ranks for the alliance and association levels. It also lists if the type is newly described based on this project or if it's a range extension for the type. Many were existing types as well.

Appendix B is the field form. The rapid assessment and releve field form that I mentioned a well as the protocol. And everything you'd want to know about how to do that survey in here.

The plant taxa included in the data analysis and how we delt with each of things.

An example of that dendrogram for the cluster analysis that I briefly showed you guys.

There's also this table that shows noteworthy or basically rare species that were found within the surveys that were sampled for this project and what vegetation type they were found in.

Here's the key to vegetation types. This key is broken up by lifeform; so tree, shrub and herb sections of the key.

This classification crosswalk for CWHR and CalVeg classification systems. And remember these are also embedded in each polygon of the map.

The accuracy assessment preliminary results that I mentioned

And then at the very end; last but not least, there's the vegetation type descriptions that I mentioned. Again, broken but by tree communities, shrub communities, and herbaceous communities. You can go to each one of these types…say the Abies concolor, or white fir alliance. There's a nice picture in there. The alliance description that I described to you. Classification confidence maybe. The sample size that went into this alliance for the project area. The same information is listed for each association under the

alliances, too. Ok, so again, I believe, Rosie will should you where we store all our reports on our website and you will eventually be able to use this like here but it doesn't work quite yet.

Slide 31 (45:46): Status

Phase 1 shown here in dark red is 100% complete and can be found on BIOS. Phase 2 and eagle lake maps are scheduled for completion coming this next spring of 2021. And just for your information, the Doyle – Loyalton vegetation map south of the project areas we have discussed today that I mentioned earlier is still in progress and it's completion is yet to be determined and is contingent upon additional funding.

Slide 32 (46:44): BIOS

As I mentioned the vegetation map from the Phase 1 mapping area is complete and can be viewed and downloaded from This biogeographic information and observation system (or BIOS) along with the applegate map and survey points that I mentioned earlier. click